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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Temperature lidar measurements from 1 to 105 km altitude using resonance, Rayleigh, and Rotational Raman scattering" *by* M. Alpers et al.

M. Alpers et al.

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The referee has suggested some enhancements on the figures and text that we have mostly performed:

- Potassium lidar is added in Figure 1.

- Arrows in Fig. 1: The arrows have been deleted from the figure.

- Separation of Figure 2 in 3 plots: We separated the figure in two. Parts (a) and (b) have the same altitude range and should remain together for better comparison between raw data temperature profiles. The scale of the figures is large enough after this separation if printed in two-column (Part a+b) or one-column (Part c) size.

- Comparison with ECMWF: For altitudes below 31 km the lidar data has been com-

pared with the best available independent data set: The co-located, simultaneous radiosonde from Kühlungsborn and two neighboured sondes. Above that height even the ECMWF analyses are mainly model results, with a limited number of satellite data assimilated in the model. We have presented the CIRA profile to give an impression on the possible start value errors, if no co-located measurement in the MLT region is available.

- Interpretation of wave structures: We have extended the description of Fig. 3 and replaced the lines 9-10 on page 933 with the following section:

"Because of the broad altitude range, altitudes of gravity wave stimulation, filtering, and dissipation can be observed simultaneously. Though it may be different waves observed during their upward propagation. Several wave parameters can be given depending on altitude as, e.g., amplitude, vertical wavelength, period, and potential energy. At 22-24 February 2003 clear wave structures appear continuously above 40 km altitude with downward propagating phase. The observed phase velocity doubles from 50 km (-0.8 km/h) to 90 km (-1.7 km/h). From Fig. 5 a dominating vertical wavelength of 12 - 15 km can be derived, but superposed with longer and shorter waves especially in the upper stratosphere and lower mesosphere. Periods have been found between 9 and 14 hours."

In the outlook we referred to a later publication which also will address the whole 5 days data set from which the profiles shown in the current paper cover only a small part. A more extended discussion on waves would exceed the aims of this paper.

- Correction "100 km". This is a misunderstanding. This sentence should explain that the altitude range of the Potassium lidar measurements on daytime is reduced to about 85-95 km altitude = 10 km vertical width. We have modified the text to make this clear.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 923, 2004.

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Interactive Comment